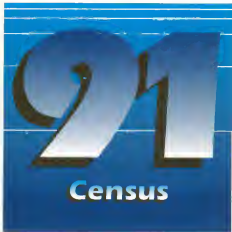




Catalogue 90-342

# Income

1991 Census Technical Reports



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Statistics Canada

# 1991 Census Technical Reports

## Income

### Reference Products series

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#### Note of Appreciation

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## Preface

Through time, the Census of Canada has become the primary source of information about Canadians and how they live. Decisions based on this information affect the social and economic affairs of all Canadians.

Statistics Canada, as the professional agency in charge of producing this information, has the responsibility for informing users of data quality. The agency must describe the concepts and methodology used in collecting and processing the data, as well as any other features that may affect their use or interpretation.

In order to describe the quality of the 1991 Census data, Statistics Canada has prepared the following publications: a census **Dictionary**, which provides concise and easy to understand textual and graphical information pertaining to census concepts; a **Handbook**, which provides an overview of how the census is conducted; and a series of **Technical Reports**, which present in greater detail, information on the quality of data for specific characteristics, such as Income, as covered in this report.

Information on data quality is important for users. It allows them to assess the usefulness of census data for their purposes as well as the risks involved in basing conclusions or decisions on these data. The 1991 Census was a large and complex undertaking and, while considerable effort was taken to ensure high standards throughout all collection and processing operations, the resulting data are inevitably subject to a certain degree of error.

Information on data quality is also important to Statistics Canada. It is an integral part in the development and maintenance of pertinent and reliable statistical programs.

This publication is a major contribution to achieving these goals. It has been prepared by Abdul Rashid, with the support of staff from three Divisions in Statistics Canada: Labour and Households Surveys Analysis, Census Operations and Social Survey Methods.

Finally, I would like to express my appreciation to the millions of Canadians who completed their questionnaires on June 4, 1991, as well as to those who assisted Statistics Canada in planning and conducting the census.

Ivan P. Fellegi  
Chief Statistician of Canada



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## I. Introduction

The census of Canada yields the most comprehensive database on the characteristics of Canadians, their families and their households. The information it collects ranges from sex and age of individuals to their ethnic origin, education, occupation and sources of income, and to their family and household characteristics.

A national census is a very large project consisting of various phases, each one of which is complex and consumes a large amount both of time and resources. The desired information is sought through a set of questions established after detailed consultations and tests. The questionnaires are collected in a specific manner by trained enumerators. The obtained information is edited for inconsistencies and errors, which are corrected, and missing information is imputed. The final results are placed on a computer database, and selected data are analyzed and published in a series of reports.

One of the important characteristics on which the 1991 Census asked questions was the sources of income of Canadians. For many purposes, information on the income of individuals and families is deemed essential. Income is the single most useful indicator of the economic well-being of Canadians. Most socio-economic analysis (of such factors as ethnicity and education), the evaluation of many programmes and policies (for example, old age security and equality of opportunity), many business decisions (such as opening of new plants and branches or retail outlets), and almost all welfare research (for example, housing affordability and changes in low income families) require relevant income data.

While a substantial amount of income statistics derived from the census are published in various forms, a very large number of users - individuals, research institutions, businesses, various levels of government, etc. - request income data tailored to their own needs. In this respect, knowledge of the concepts underlying census variables and their limitations and quality would help users both to appreciate the available published data and to design suitable specifications for their own needs. This document, the **1991 Census Technical Report on Income**, is produced to serve as a guide to users of census income data.

Section II explains the concept of income and provides definitions of various sources of income and derived income variables. Included in that section are brief definitions of a few important variables which are often used in conjunction with income. Section III describes briefly the collection methods and reproduces the income questions on the 1991 Census questionnaire along with relevant instructions from the Guide for respondents. Section IV explains the processing operations undertaken in regional and head offices. Section V describes the various phases of edit and imputation and provides an overview of steps followed to prepare income data for public release. Section VI includes brief notes on the types of errors which occur during the census cycle, refers to the studies undertaken to quantify these errors, and provides information on the quality of income data. Section VII provides information on general changes to the census content and coverage since the 1986 Census and a detailed comparison of income-related content and coverage in the census since 1961. Section VIII lists the various products on income from the 1991 Census.

## II. Concepts and Definitions

The **1991 Census Dictionary** (Catalogue No. 92-301E) contains detailed definitions of census terms, variables and concepts. Users should refer to the 1991 Census Dictionary for full definitions and additional remarks related to any concepts and definitions not found in this chapter.

### 1. Concept of Income

A mention of income without any qualification begs the question: 'What is income?' When asked about his/her income, a working individual will mostly likely state his/her wage from work or profits from self-employment in a business activity, while a non-working or retired person will likely give his/her income from investments or pension benefits, etc. In some cases, government transfer payments such as unemployment insurance benefits and family allowances will be included in the answer.

Like most concepts, the income concept is generally tailored to an objective. For example, while certain receipts are not included in income for taxation purposes, the value of all goods and services produced by the nation is included to measure national income. The census income concept refers to all money income before taxes.

Income is usually generated over time. It is generally stated as an amount per hour, week, month or year. It is, therefore, also important to specify clearly, in addition to the constituents of income, the time period for which the respondent is to report his/her income.

In addition to the constituents of income and the period covered, it is also important to specify the 'income unit', (an individual, family, etc.) which received income. The census collects income information from all individuals 15 years and over in a sample of households. From other information on the questionnaire, incomes for other units such as families, households or spouses can easily be calculated.

For the purposes of the census, income includes all cash receipts by individuals 15 years and over from employment, investments, government transfer payments and other miscellaneous sources during the calendar year preceding the census. It excludes income in kind and lump-sum payments. For detailed definitions of income sources and total income, see Section 3 below.

### 2. Components of Income

Income stems from many sources. These sources can be grouped broadly as follows:

#### (a) Employment Income

The primary source of income is employment or work, which may be undertaken either for others or for oneself. The monetary return to the employees is generally called a wage or a salary, and the return to those working for themselves is called income from self-employment (profit/loss). The two components together are generally referred to as 'employment income' or 'earnings'.

#### (b) Investment Income

The combined use of labour and capital results in self-employment income, while labour alone usually entitles one to a wage or salary. Use of capital alone also produces income, referred to as investment income, in the form of interest, dividends, rent, etc.

#### (c) Transfer Payments

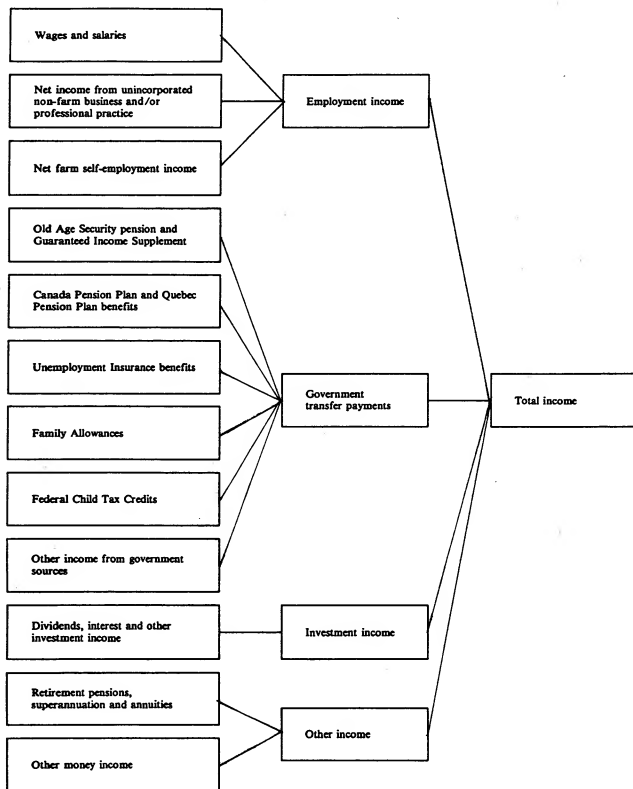
A very common source of income among Canadians is government transfer payments. These payments consist of demogrants which are more or less universal (like the Old Age Security pension), social insurance (such as Canada/Quebec Pension Plan benefits and unemployment insurance benefits), income-tested assistance (for example, child tax credits, guaranteed income supplements) and needs-tested assistance (such as mothers' allowance).

(d) **Other Sources**

Finally, income is also received from miscellaneous sources such as retirement pensions and alimony.

The above broad framework is depicted in **Figure 1**. The items in the figure are based on the primary income data from the 1991 Census database. Detailed definitions of sources of income and related variables are presented in Section 3 below.

Figure 1. Components of Income



### 3. Definitions

#### (1) Sources Of Income

##### (a) Wages and Salaries

Refers to gross wages and salaries from all jobs, before deductions for such items as income tax, pensions, unemployment insurance, etc. Included in this source are military pay and allowances, tips, commissions, and cash bonuses, as well as all types of casual earnings in the calendar year 1990. Respondents were asked to exclude the value of taxable allowances and benefits provided by employers such as free lodging, free automobile use, etc.

Salesmen who worked for more than one company, or who maintained their own office or staff, were asked to report their commissions as "non-farm self-employment" income. Also, persons baby-sitting in their own homes and newspaper boys/girls were asked to report their income in the non-farm self-employment category.

##### (b) Net Income from Unincorporated Non-farm Business and/or Professional Practice

Refers to net income (gross receipts minus expenses of operation such as wages, rents, and depreciation) received during the calendar year 1990 from the respondent's non-farm unincorporated business or professional practice. In the case of partnerships, only the respondent's share of profits or loss was to be reported. Also included in this source is net income of persons babysitting in their own homes, of operators of direct distributorships such as selling and delivering cosmetics, as well as of free-lance artists, writers, music teachers, hairdressers, dressmakers, etc.

##### (c) Net Farm Self-employment Income

Refers to net income (gross receipts from farm sales minus cost of operation and depreciation) received during the calendar year 1990 from the operation of a farm, either on one's own account or in partnership. In the case of partnerships, only the respondent's share of net income was to be reported. Also included in this income source are advance, supplementary or assistance payments to farmers by federal or provincial governments. However, the value of income "in kind", such as agricultural products produced and consumed on the farm, is excluded.

Agricultural operations include the production of field crops, vegetables, fruits, greenhouse and nursery products and seeds, and of maple products; raising poultry and livestock; production of animal products such as eggs, milk and wool; and fur farming and beekeeping.

##### (d) Old Age Security Pension and Guaranteed Income Supplement

Refers to Old Age Security pensions and Guaranteed Income Supplements paid by the federal government to persons 65 years of age and over, and Spouses' Allowances paid to 60- to 64-year-old spouses of Old Age Security recipients during the calendar year 1990. Also included are extended Spouses' Allowances paid to 60- to 64-year-old widows/widowers whose spouses were Old Age Security pension recipients. (Provincial income supplements to GIS recipients are included in "other income from government sources").

##### (e) Benefits from Canada/Quebec Pension Plan

Refers to benefits received during 1990 under the Canada or Quebec Pension Plans, e.g., retirement pensions, survivors' benefits, and disability pensions.

Lump-sum death benefits from the plans are not considered income. Retirement pensions of civil servants, RCMP and military personnel are reported separately under "Retirement Pensions".

**(f) Benefits from Unemployment Insurance**

Refers to the total Unemployment Insurance benefits received in the calendar year 1990, before income tax deductions. It includes benefits for sickness, maternity, work-sharing, retraining and retirement, and those paid to self-employed fishermen under the federal unemployment insurance program.

**(g) Family Allowances**

Refers to federal as well as provincial allowances paid during the calendar year 1990 in respect of children under 18 years of age. For Quebec residents, "Allowance for children less than 6 years of age" and "Allowance for newborn children" are included. (Information on this source of income was not collected directly from the respondents. Instead, the family allowances were calculated on the basis of other information on the census questionnaire and included in the income of one of the parents.)

**(h) Federal Child Tax Credit**

Refers to federal child tax credits paid during the calendar year 1990 in respect of children under 18 years of age. (These credits, though not collected directly from the respondents, were calculated and included in the income of one of the parents.)

**(i) Other Income from Government Sources**

Refers to all transfer payments excluding those listed above received by individuals under federal, provincial or municipal programs in the calendar year 1990. Included are social assistance payments to persons in need such as mothers with dependent children, persons temporarily or permanently unable to work, elderly individuals, the blind and the disabled. Provincial income supplements to recipients of Old Age Security and Guaranteed Income Supplement benefits are also included, as are the provincial payments to seniors to help offset accommodation costs. Also included are other transfer payments, such as for training under the National Training Program (NTP), veteran's pensions and allowances, workers' compensation, etc. Finally, provincial tax credits and allowances claimed on the income tax return are included as, for example, 'Nova Scotia Tax Credits', 'New Brunswick Tax Credits', 'Quebec Real Estate Tax Refund', 'Ontario Tax Credits', 'Manitoba Tax Credits', 'Alberta Royalty Tax Credits', 'Alberta Tax Credits', 'British Columbia Tax Credits' and 'Yukon Territory Tax Credits'.

**(j) Investment Income**

Refers to interest received in the calendar year 1990 from deposits in banks, trust companies, co-operatives, credit unions, caisses populaires, etc., as well as interest on savings certificates, bonds and debentures and all dividends from both Canadian and foreign stocks. Also included is other investment income from either Canadian or foreign sources, such as net rents from real estate, mortgage and loan interest received, regular income from an estate or trust fund, and interest from insurance policies.

**(k) Retirement Pensions, Superannuation and Annuities**

Refers to all regular income received during the calendar year 1990 as a result of having been a member of a pension plan of one or more employers. This source includes payments received from all annuities, including payments from a matured registered retirement savings plan (RRSP) in the form of a life annuity, a fixed term annuity, a registered retirement income fund (RRIF) or an income-averaging annuity contract; pensions paid to widows or other relatives of deceased pensioners; pensions of retired civil servants, Armed Forces personnel and RCMP officers; annuity payments received from the Canadian Government Annuities Fund, an insurance company, etc. Severance pay and retirement allowances and pensions from outside Canada are included in "Other income".

Lump-sum death benefits, lump-sum benefits or withdrawals from a pension plan or RRSP, or refunds of over-contributions, are not considered income.

**(1) Other Money Income**

Refers to regular cash income received during the calendar year 1990 and not reported in any of the above sources. Alimony, child support, periodic support from other persons not in the household, net income from roomers and boarders, income from abroad (except dividends and interest), non-refundable scholarships and bursaries, severance pay, royalties, strike pay, etc., are reported in this source.

**(2) Total Income**

Total income is the sum of amounts received during 1990 by an income recipient from the 12 sources listed and defined above. The amounts against the various sources and against total income are actual dollars reported or assigned. Although the census questionnaire includes a question on 'total income', that information was used only for control purposes. The final variable 'total income' is derived by summing all the sources of income after those sources have been processed through edit and imputation.

It is important to note that the census income concept does not include gambling gains and losses, money inherited during the year in a lump sum, capital gains or losses, receipts from the sale of property or personal belongings, income tax refunds, loans received, loans repaid to an individual as the lender, lump-sum settlements of insurance policies, rebates of property taxes and other taxes, and refunds of pension contributions were excluded as well as all income in kind such as free meals, living accommodation, or agricultural products produced and consumed on the farm.

**(3) Derived Income Variables**

From the sources of income (and sometimes in combination with other related variables), a number of other income variables are derived and included in the census database. The most important of these variables is, of course, 'total income', as described above. Others are briefly explained below.

**(a) Employment Income**

Employment income, also known as earnings, consists of total income received during 1990 as wages and salaries, net income from non-farm self-employment and/or net farm income.

**(b) Census Family Income**

A census family consists of a couple, married or living common-law, with or without never-married children, or a lone parent with one or more never-married children. The total income of a census family is the sum of the total incomes of all members of that family.

**(c) Economic Family Income**

An economic family consists of all persons related by blood, marriage or adoption and living in the same household. The total income of an economic family is the sum of the total incomes of all members of that family.

**(d) Household Income**

A household consists of all persons, irrespective of their interrelationship, living in a dwelling. The total income of a household is the sum of the total incomes of all members of that household.

**(e) Income Status**

This variable indicates the status of a family unit (economic family or unattached individual) in relation to Statistics Canada's low income cut-offs (LICOs), that is, whether the total income of a family unit is above or below the applicable cut-off point. Statistics Canada introduced these low income cut-offs in 1968 based on 1961 Census income data and on 1959 family expenditure patterns. The expenditure data indicated that, on average, Canadian families spent about 50% of their income on food, shelter and

clothing (components of expenditure that fit broadly into the "basic necessities" category). It was arbitrarily assumed that a family which had to spend 70% or more of its income on these basic essentials would be left with very little discretionary income and would, therefore, be in "straitened circumstances". With this assumption, low income cut-off points were set for seven different sizes of families.

The national family expenditure data for 1986 indicated that Canadian families spent, on average, about 36.2% of their income on food, shelter and clothing (compared with 38.5% in 1978 and 42% in 1969). By maintaining the postulated 20-percentage-point difference in average expenditure as a proportion of income between what low-income and all families spend on food, shelter and clothing, the revised low income cut-offs were determined at income levels (differentiated by family size and degree of urbanization) where, on average, 56.2% of income was spent on food, shelter and clothing.

Since the revision based on the 1986 family expenditure data, the low income cut-offs have been updated every year by changes in the consumer price index. Table 1 shows the 1990 cut-offs.

**Table 1. Low Income Cut-offs of Family Units, 1990**

Size of family	Size of area of residence				
	500,000 or more	100,000 to 499,999	30,000 to 99,999	Small Urban areas	Rural areas
1 person	14,155	12,433	12,146	11,072	9,637
2 persons	19,187	16,854	16,464	15,008	13,064
3 persons	24,389	21,421	20,926	19,076	16,605
4 persons	28,081	24,662	24,094	21,964	19,117
5 persons	30,680	26,946	26,324	23,997	20,887
6 persons	33,303	29,248	28,573	26,047	22,672
7 or more persons	35,818	31,460	30,734	28,017	24,385

**Users should note the following points:**

- (i) Given the widespread misunderstanding concerning the nature of the cut-offs, it is useful to spell out unambiguously what they are and what they are not. As will be apparent from the above brief description, the cut-offs are not poverty lines and should not be so interpreted. The setting of poverty lines necessarily involves a value judgement as to the level of minimum income below which an individual or family would generally be regarded as "poor". No such judgement has been attempted in constructing the low income cut-offs. Rather, these cut-offs were designed in response to the need to quantify the numbers and characteristics of individuals and families falling into the lowest income category - defined in relative terms, taking into account current overall levels of living. The low income cut-offs do not take into account a number of important factors such as wealth (for example, home ownership and mortgage indebtedness), access to subsidized goods and services, and future earnings potential, and as a result, while many individuals or families falling below the cut-offs would be considered in "poverty" by almost any Canadian standard, others would be deemed by most to be in quite comfortable circumstances.
- (ii) The concept of LICOs applies to economic families and unattached individuals. The economic family concept is broader than the census family concept. However, since all members of an economic family share a common income status, it is possible to produce low-income statistics for census families or the population in private households.
- (iii) Annual low income statistics are published from the data collected in the Survey of Consumer Finances. It may be pointed out that the census and the Survey differ slightly when applying the



"Size of Area" or "Degree of Urbanization" classification to derive incidence of low income. However, the overall impact of this difference is negligible.

- (iv) The low income cut-offs are based on certain expenditure-income patterns which were not available from survey data for the entire population. For this reason, the population resident in the Yukon and Northwest Territories and on Indian reserves is excluded.

To summarize, Statistics Canada's low income cut-offs identify the lowest income groups, taking into account family size and area of residence classification.

#### (4) Related Variables

The census database allows users to cross-classify income by a host of population, family and household characteristics. For ease of reference, the more important census variables related to income are listed below. For definitions, users should consult the 1991 Census Dictionary, relevant census guides and other documents.

##### (a) Demographic Variables

These include such basic variables as age, sex, marital status, and family relationship.

##### (b) Ethno-cultural Variables

These include mother tongue, language, ethnic origin, immigration and citizenship, etc.

##### (c) Economic Variables

These include education, weeks worked, class of worker, occupation, etc.

##### (d) Family/Household Variables

Census data can be produced for individuals, families or households. When income is being analyzed at the family or household level, it is possible to relate it to individual characteristics by specifying a particular individual (e.g., a wife) in the family or household (e.g., the first person). Family and household variables, often used in conjunction with income, include number of persons, number of children (of various ages), number of earners or income recipients, family structure, household type, family or household composition, etc.

##### (e) Geographic Variables

Statistics Canada uses a detailed geographic structure that makes it possible to obtain information for many different geographical areas. Data from the 1991 Census are available for numerous standard geographic areas, as well as for non-standard or user-defined areas. Census income data are disseminated for a number of standard geographic areas as follows:

- (i) **Legislative/administrative areas** are defined, with a few exceptions, by Canadian federal and provincial statutes. These include provinces and territories, federal electoral districts (FEDs), census divisions (CDs), census subdivisions (CSDs) and subprovincial regions (SPRs).
- (ii) **Statistical areas** are defined by Statistics Canada as part of the spatial frame used to collect and disseminate census data. Among others, these include census metropolitan areas (CMAs), census agglomerations (CAs), census tracts (CTs) and urban/rural areas.

Other geographical units of a quasi-standard nature are the **unincorporated place (UP)**, **township, range and meridian**, and **postal code**. For a complete description of geographical terms, concepts and areas, consult the geography section of the **1991 Census Dictionary**.

(5) **Most-used Income Statistics**

Users of census income and other data have, to a large extent, total flexibility to define the statistics required by them. The following are some of the statistics which are more commonly used:

(a) **Income Size Distributions**

Although census income variables show the actual dollar values in the database, these are normally grouped into a few categories to classify the income units by income size groups. It is often useful to obtain both numeric and percentage distributions. The number of feasible groups would depend on several factors. It should, however, be kept in mind that too detailed a distribution will be subject to large sampling errors.

(b) **Average Income**

Average income is defined as the weighted mean total income of a group, and is calculated from unrounded data by dividing the aggregate income of the group by the number of units in that group.

While this is the standard definition of an average, it should be noted that **average income (total income or income from a component) of individuals is always derived by dividing the aggregate income by the number of income recipients**. The results of most analysis based on averages which include individuals without income could be quite misleading.

However, **the average incomes of non-family persons, families and households are always calculated by dividing the aggregate income by the number of units, whether or not they had any income**. Although all households, families and a non-family persons are expected to have income during the reference period, there are some minor exceptions. It is possible for a family or a non-family person to have subsisted without income by reducing past savings or by going into debt. In other cases, zero-income situations result from changes in family composition, recent immigration, etc. Some of the families not reporting income may have either been newly formed or undergone a change in family composition through marriage, divorce or widowhood. Most of the families with female reference persons without income may fall into this category. The majority of other families without any income may in fact be families which recently migrated to Canada and were instructed not to report incomes from non-Canadian sources. Similar reasons apply to most of the non-family persons not reporting income. On the whole, the number of such cases of zero income is extremely small.

(c) **Standard Error of Average Income**

Users may wish to obtain standard errors for the average incomes produced for them. This statistic is an estimate of the error introduced into these data by the fact that they are collected only from a one-in-five random sample of households. There is a 95% probability that the true average income of a group (the value that would have been obtained had sampling not been used) lies within plus or minus two standard errors, and there is a 99% probability that the true average lies within plus or minus three standard errors. The estimated standard error does not include the effects of certain types of response error, or systematic or coverage errors.

(d) **Median Income**

Median income of a specified group is defined as that amount which divides its income size distribution into two halves, that is, the incomes of the first half are below the median, while those of the second half are above the median. The organization of the census database is such that it does not lend itself to easy calculation of true medians. Therefore, estimates of median income from census data are derived from grouped data. For highly skewed distributions, the median is generally a better measure of central tendency than the mean.

(e) **Incidence and Composition of Income**

The presence of actual dollars allows users to produce aggregate amounts of income from various sources which, in turn, can be used to obtain and analyze the income composition of various groups.

Similarly, it is possible to generate from the census database the incidence of various sources of income among individuals, families and households.

**(f) Major Source of Income**

It is possible to obtain a distribution of individuals, families or households by their major source of income. This variable is an indicator of the income component, which constitutes the largest proportion of the total income of an income unit. Various combinations of income sources can be used to derive this classification. For example, the various income sources can be combined into five components, as follows: wages and salaries, self-employment (non-farm and farm) income, government transfer payments, investment income and other income (retirement pensions and other money income). The absolute values for these components are compared and the component with the largest absolute value is designated as the major source of income.

**(g) Incidence of Low Income**

The incidence of low income is defined as the proportion or percentage of economic families or unattached individuals in a given classification below the low income cut-off. Since all members of an economic family share a common status, incidence of low income is also calculated for the population in private households.

### III. Data Collection and Coverage

This section is divided in two parts. The first part provides general information on the coverage and collection aspects of the census of population. The second part describes the income content and provides a copy of the income questions on the 1991 Census questionnaire and the related instructions included on each income source in the Guide which accompanies the questionnaire.

#### 1. Coverage and Collection - General

For the 1991 Census, information was collected from more than 11 million dwellings both in Canada and abroad. The data collection process consisted of drop-off and retrieval of approximately 11,500,000 questionnaires. All questionnaires, once received by the field staff, were checked for completion. In case of non-response to the entire questionnaire or to designated mandatory questions, the Census Representative went back to the household to obtain the needed information. **The question on sources of income was designated a mandatory question in the 1991 Census.** Once each Census Representative had completed their field edit and follow-up for all the households in their assigned areas, the questionnaires were forwarded to one of the regional offices for further processing. This phase employed approximately 40,000 persons in a variety of tasks, from mapping to post-censal activities.

Two **collection methods** were used for the 1991 Census: **self-enumeration** and **canvasser enumeration**. In self-enumeration areas, a questionnaire (Form 2A or Form 2B) was dropped off at each household before Census Day (June 4). A member of the household was to complete the questionnaire on Census Day and mail it back in a pre-addressed envelope. In canvasser areas, census representatives completed a long form questionnaire (Form 2D) for each household in these areas by interview. In 1991, less than 2% of households were enumerated by canvassers. This method was used to enumerate households in remote or northern areas and on Indian reserves where irregular mail service makes mail-back impractical. Some of the remote areas were enumerated as early as March 1991.

The 1991 Census collected data on **every Canadian citizen, landed immigrant and non-permanent resident alive at midnight between June 3 and June 4, 1991.**

#### 2. Coverage and Collection - Income

The resources spent on a modern census are so large that, to ensure that the maximum benefit is derived from such a huge investment, the census usually collects more than the basic demographic data. At the same time, governments are sensitive to the issue of response burden. Canada, like some other countries, has adopted an approach which attempts to meet the dual objective of efficient use of resources and lower response burden.

This approach consists of making use of two basic forms to collect information, a short form (Form 2A) and a long form (Form 2B). The short form contains questions on age, sex, marital and common-law status, family relationship, mother tongue and home ownership. The answers to these questions provide the basic data on the population and housing characteristics of the nation. In 1991, four out of five households in Canada received this short questionnaire.

The long form, in addition to including the basic questions used on the short form, asks questions on ethnic origin, immigration, education, language, mobility, labour force activity, industry, occupation and income. Thus, the answers to these questions provide a social and economic portrait of Canada at the time of the census. This long form was distributed to a 20 percent sample, or one in five households, in 1991.

The income question consisted of 10 questions on sources of income and a question on total income. Each question was addressed to individuals 15 years and over in the sampled households. Income information was not collected from individuals under 15 years of age, institutional residents, and recent immigrants who entered Canada between January 1 and June 3, 1991.

The respondents were asked to provide an amount against the sources from which they received an income during the calendar year 1990. Variations of Form 2B (Forms 2C, 2D and 3) were used for certain segments of the

population. For example, Form 2C was given to Canadians abroad, while Form 2D was used in canvasser areas. However, it is sufficient to know that the income questions on these forms solicited the same information as those on the 2B questionnaire.

A facsimile of the 1991 Census income question is reproduced in Figure 2.

Although there are 10 sources of income listed on the questionnaire, it is important to advise the respondents about the components of each source. To this end, a Guide is produced for respondents which explains each question on the Form 2B. This Guide is included in the drop-off package for each household in the sample. The portion of the Guide dealing with income questions is reproduced in Figure 3.

Figure 2. 1991 Census: Income Questions

INCOME IN 1990	61.	62.
<b>45.</b> During the year ending December 31, 1990, did this person receive any income or suffer any loss from the sources listed below? <ul style="list-style-type: none"> <li>• Answer "Yes" or "No" for all sources.</li> <li>• If "Yes", also enter the amount; in case of a loss, also mark "Loss".</li> <li>• Do not include Family Allowances and Child Tax Credits.</li> <li>• Consult the Guide for details.</li> </ul>		
(a) Total wages and salaries including commissions, bonuses, tips, etc., before any deductions	Dollars Cents 01 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 02 <input type="radio"/> No	Dollars Cents 01 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 02 <input type="radio"/> No
(b) Net income from unincorporated non-farm business, professional practice, etc., on own account or in partnership (gross receipts minus expenses)	03 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 05 <input type="radio"/> No      04 <input type="radio"/> Loss	03 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 05 <input type="radio"/> No      04 <input type="radio"/> Loss
(c) Net farm self-employment income from agricultural operations on own account or in partnership (gross receipts minus expenses)	06 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 08 <input type="radio"/> No      07 <input type="radio"/> Loss	06 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 08 <input type="radio"/> No      07 <input type="radio"/> Loss
(d) Old Age Security Pension and Guaranteed Income Supplement from federal government only (provincial income supplements should be reported in (g))	09 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 10 <input type="radio"/> No	09 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 10 <input type="radio"/> No
(e) Benefits from Canada or Quebec Pension Plan	11 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 12 <input type="radio"/> No	11 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 12 <input type="radio"/> No
(f) Benefits from Unemployment Insurance (total benefits before tax deductions)	13 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 14 <input type="radio"/> No	13 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 14 <input type="radio"/> No
(g) Other income from government sources including provincial income supplements and grants and social assistance, e.g., veterans' pensions, workers' compensation, welfare payments (do not include Family Allowances and Child Tax Credits)	15 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 16 <input type="radio"/> No	15 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 16 <input type="radio"/> No
(h) Dividends and interest on bonds, deposits and savings certificates, and other investment income, e.g., net rents from real estate, interest from mortgages	17 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 19 <input type="radio"/> No      18 <input type="radio"/> Loss	17 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 19 <input type="radio"/> No      18 <input type="radio"/> Loss
(i) Retirement pensions, superannuation and annuities	20 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 21 <input type="radio"/> No	20 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 21 <input type="radio"/> No
(j) Other money income, e.g., alimony, scholarships	22 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 23 <input type="radio"/> No	22 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 23 <input type="radio"/> No
(k) TOTAL INCOME from all of the above sources	24 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 26 <input type="radio"/> No      25 <input type="radio"/> Loss	24 <input type="radio"/> Yes ▶ <input type="text"/> <input type="text"/> 26 <input type="radio"/> No      25 <input type="radio"/> Loss

**Figure 3. 1991 Census Guide: Income Questions****Question 45: Income in 1990**

Information on income provides the most important indicator of the well-being of Canadians: of men and women, young and old, of trades and office workers, artists and scientists and of families and households. No other source - not even income tax records - can provide this level of detail.

Governments use the detailed analysis made possible by the census to develop income support programs, welfare provisions and social services.

Businesses use census income data in marketing products, in locating retail and wholesale sites near the appropriate groups of consumers, and in developing new products and services.

Statistics Canada does not publish personalized income information. The information collected from these questions is used to look at general trends and does not in any way identify individuals.

Information on this census questionnaire is strictly confidential by law and no individual, government department or agency outside of Statistics Canada has access to it. The Statistics Act prohibits Statistics Canada from disclosing any information that can be related to any individual person or company.

Answer every part of this question whether or not a person was working. For each part, the income reported should be the total money income received during the calendar year 1990. For persons who had no income, mark the circle labelled **No**. In the case of a loss, report the amount in the box provided and mark the circle labelled **Loss**.

If unsure of an answer, consult relevant documents such as income tax returns. Otherwise, make your best estimate.

For persons who received income from abroad, report this income in Canadian dollars. However, for persons who immigrated to Canada after January 1, 1990, do not report any income received before arrival in Canada.

Do not report either the Family Allowances (baby bonuses) received from the federal and provincial governments or the Child Tax Credits. These allowances and credits will be estimated for each family from the number of children shown on the questionnaire.

Do not include as income: gambling gains and losses, lottery prizes, money inherited during the year in a lump sum, capital gains or losses, receipts from the sale of property, income tax refunds, loan payments received, lump-sum settlements of insurance policies, rebates received on property taxes or refunds of pension contributions.

**Part (a): Total Wages and Salaries**

Report total wages and salaries from all jobs before deductions for income tax, pensions, hospital insurance, etc. (do not report take-home pay).

Include military pay and allowances.

Include tips and cash bonuses received during 1990. Also include all types of casual earnings whether or not T4 slips for income tax have been issued.

Include commissions. However, for salespersons who worked for more than one company, or who maintained their own office or staff, report such income in part (b). Also, for persons who baby-sit in their own home or who are newspaper delivery persons, report their income in part (b).

Do not include the value of taxable allowances and benefits provided by employers such as free lodging, free automobile use, bursaries, travelling expenses of a spouse or contributions towards medical insurance.

If consulting T4 slips to answer this question, report employment income shown in box 14, less the value of taxable allowances and benefits shown in boxes 30 to 40.

For persons who own an unincorporated business or farm, report the net income from that business or farm in part (b) or (c), whichever is appropriate.

**Part (b): Net Income from Unincorporated Non-farm Business, Professional Practice**

Report an amount in the box provided for persons who owned and operated a non-farm, unincorporated business or professional practice during 1990, alone or in partnership. In the case of a partnership, report only their share of the net income. Report receipts from incorporated businesses in part (a) and/or part (h).

Report net income (gross receipts minus expenses of operation such as wages, rents or depreciation). Do not subtract personal deductions such as income tax and pensions.

Report net income from employment activities for self-employed fishermen, trappers and hunters in this part.

Report net income for persons who baby-sit in their own home, operate a direct distributorship such as selling and delivering cosmetics, newspapers, or obtain contracts or agreements to do odd jobs.

Report net income from free-lance activities (for example, artists, writers, music teachers).

In the case of a loss, report the amount and mark the circle labelled **Loss**.

**Part (c): Net Farm Self-employment Income**

In the box provided, report an amount only for persons who operated a farm in 1990, alone or in partnership. In the case of a partnership, report only their share of the net income.

Report net income (gross receipts from farm sales minus depreciation and cost of operation). Include cash advances in gross receipts for the year in which they are received. Also include government supplementary payments. In the case of a loss, report the amount and mark the circle labelled **Loss**.

Exclude the value of income "in kind" (for example, agricultural products produced and consumed on the farm).

For persons who employed a manager to run their farm, deduct the manager's salary as expenses. For persons who rented out their farm, report the net rent received in part (h). Similarly, report income from incorporated farms in part (a) and/or part (h).

Agricultural operations include the production of field crops, vegetables, fruits, greenhouse/nursery products and seeds, maple products, poultry and livestock, animal products such as eggs, milk and wool, fur farming, and beekeeping.

**Part (d): Old Age Security Pension and Guaranteed Income Supplement**

In the box provided, report Old Age Security Pension and Guaranteed Income Supplement (for persons 65 years and over) received from the federal government only. For persons who are 60 to 64-year-old spouses/widow(er)s of Old Age Security Pension recipients, report Spouse's Allowance received from the federal government.

Report provincial income supplements in part (g). Report retirement pensions of civil servants, RCMP and military personnel in part (i). Report old age, retirement and war pensions and other similar payments received from foreign governments in part (j).

**Part (e): Benefits from Canada or Quebec Pension Plan**

Report benefits received under the Canada or Quebec Pension Plan (such as retirement pensions, survivors' benefits and disability pensions) in the box provided.

Do not report lump-sum death benefits.

Do not report contributions to the plan, but report the benefits from it.

Report retirement pensions of civil servants, RCMP and military personnel in part (i).



**Part (f): Benefits from Unemployment Insurance**

Report total unemployment insurance benefits before income tax deductions in the box provided. Include benefits for sickness, maternity, work sharing, fishing, retraining and retirement received under the Federal Unemployment Insurance program.

**Part (g): Other Income from Government Sources Including Provincial Income Supplements and Grants and Social Assistance**

In the box provided, report payments received from provincial or municipal programs for people in need such as mothers and/or fathers with dependent children, persons temporarily or permanently unable to work, elderly individuals, blind individuals and disabled individuals. Include cash benefits covering basic needs such as food, fuel, shelter and clothing, plus cash benefits for special needs.

Include provincial income supplements such as payments to seniors to supplement Old Age Security Pension and Guaranteed Income Supplement as well as payments to seniors to help offset accommodation costs.

Include any amounts received in 1990 for refundable provincial tax credits, federal sales tax credit and federal Goods and Services Tax Credit. Quebec residents should report "Real Estate Tax Refund".

Include all other transfer payments such as worker's compensation, veterans' pensions, war veterans' allowances, pensions to widows and dependants of veterans, or benefits under the Canadian Jobs Strategy.

Do not include Family Allowances and federal Child Tax Credits.

Report retirement pensions of military personnel, civil servants, etc., in part (i).

**Part (h): Dividends and Interest on Bonds, Deposits and Savings Certificates, and Other Investment Income**

For dividends received from Canadian corporate stocks, report the actual amount of dividends received, not just the taxable amount.

Report dividends received from foreign stocks.

Report interest from deposits in banks, trust companies, co-operatives, credit unions, caisses populaires, as well as interest on savings certificates, bonds and debentures.

Report net rents from real estate (including farm land), mortgage and loan interest received, regular income from an estate or trust fund, and interest from insurance policies.

Include investment income received from abroad.

If total investment income is a loss, report the amount and mark the circle labelled **Loss**.

**Part (i): Retirement Pensions, Superannuation and Annuities**

In the box provided, report any income received as a result of having been a member of a pension plan of one or more employers; payments received from all annuities, including payments from a matured registered retirement savings plan (RRSP) in the form of a life annuity, a fixed term annuity, a registered retirement income fund or an income-averaging annuity contract; pensions paid to widow(er)s or other relatives of deceased pensioners; pensions of retired civil servants, Armed Forces personnel and RCMP officers; and annuity payments received from the Canadian Government Annuities Fund, or from an insurance company.

Do not include lump-sum death benefits, lump-sum benefits and withdrawals from a pension plan or RRSP, or refunds of overcontributions. Enter severance pay and retirement allowances and pensions from outside Canada in part (j).

**Part (j): Other Money Income**

Include all other regular cash income not covered in the questions above.

Examples:

- alimony;
- child support;
- periodic support from persons not in the household;
- net income from roomers and boarders;
- income from abroad (e.g., pensions) except dividends and interest which should go into part (h);
- non-refundable scholarships and bursaries;
- severance pay and retirement allowances;
- royalties;
- strike pay.

**Do Not Include:**

- Family Allowances (baby bonuses) and federal Child Tax Credits;
- cash refund of pension fund contributions;
- lump-sum death benefits or any other one time lump-sum payment.

## IV. Data Assimilation

Data assimilation is the processing phase during which data from the census questionnaires are edited, coded and captured. The process includes the transformation of the questionnaire responses into machine-readable form. The four main components of data assimilation are:

- regional office processing
- direct data entry
- <sup>main or central</sup> head office processing
- automated coding

Specific procedures carried out for the income data have been explained under the appropriate section below. Since automated coding had no impact on the processing of income, its description is omitted.

### 1. Regional Office Processing (ROP)

ROP operations consisted of the following:

#### (a) General

All completed questionnaires are received in one of the seven regional processing centres across the country. On receipt, the questionnaires are logged, counted and prepared for key entry. Preparation includes consistency checks between the questionnaires and the Visitation Record to make sure that the number of household members on both documents matches. Legibility checks ensure that the documents are suitable for computer entry. Finally, all written answers are converted into numerical codes.

In 1991, this operation employed approximately 2,000 people and was completed during the period between July and November of 1991.

#### (b) Income

In the case of income, detailed instructions were given to prepare the income questions for key entry. The instructions included the following procedures:

- convert non-annual values (for example, per month) into their annual amounts;
- convert values reported in foreign currencies into Canadian dollar equivalents;
- resolve multiple amounts reported against a single source; and
- resolve cases where a range of values was reported (e.g., \$10,000 to \$15,000).

If a problem was not covered by the specified procedures, the regional office sought the advice of subject-matter specialists. The problem was described by the regional staff through a 'technical assistance request form (TARF)'. TARFs were faxed to head office and the problems were generally resolved the same day. In 1991, only 193 TARFs were filled out for income questions, most of which sought clarification of written responses.

### 2. Direct Data Entry (DDE)

The data entry activity was completed on behalf of Statistics Canada by Revenue Canada - Taxation (RCT). Questionnaire data were key-entered at seven RCT regional centres, transmitted to RCT headquarters in Ottawa and

stored on tape cartridges. This operation employed approximately 1,500 persons sworn to secrecy under the Statistics Act.

### 3. Head Office Processing (HOP)

#### (a) General

Head office processing is a combination of automated and manual processing designed to carry out structural edits on the census data and to process special enumeration returns. Included are returns for Canadians overseas, temporary residents and merchant and navy ships' personnel. HOP also processes coverage study returns such as the reverse record check (RRC), vacancy check (VC), and overcoverage study (OC). In addition, HOP is responsible for the preliminary and final population and dwelling counts and for the microfilming of census questionnaires for archival purposes. This operation employs approximately 150 persons and is conducted at the Statistics Canada head office in Ottawa.

Head office processing consisted of four major activities performed in three phases:

##### • DA I – Receipt, Registration and Storage

Visitation records and questionnaires for each enumeration area were received, registered and stored at the head office. Tapes containing respondent data were copied and loaded into the HOP database.

##### • DA II – Data Analysis

Automated structural edits were carried out at the enumeration area, household and person levels, and inconsistencies, such as person count conflicts and household number conflicts, were resolved manually.

##### • DA III – Special Processing

Special enumeration returns from Canadians living outside Canada, temporary residents, and persons aboard merchant, naval and coast-guard vessels were adjusted to include them. In addition, coverage study returns for checking vacant dwellings, undercoverage, and overcoverage were processed, and adjustments were done to the data based on the results of the vacancy check.

##### • Preliminary counts

HOP was also responsible for the preliminary and final population and dwelling counts and for the microfilming of census questionnaires for archival purposes.

#### (b) Income

For the income questions, certain errors, if left uncorrected, could lead to distortions which could have serious repercussions on the quality and credibility of census income data. For example, a respondent-provided amount of \$90,000 in wages and salaries could be entered erroneously with an additional zero, changing the original amount to \$900,000. Similarly, an amount of \$9,000 in Unemployment Insurance benefits could be erroneously converted to \$90,000. A few errors of this magnitude in the first source could quickly add millions of dollars to wage estimates, while similar errors in the second source could lead to ridiculous estimates.

To safeguard against such errors, all amount entries were checked against specified limits, for example \$125,000 for wages and salaries, \$19,000 for unemployment insurance benefits, and so on. All records were subjected to this edit. If an amount reported was in excess of the limits for a particular source, the relevant questionnaire was identified, examined and the information corrected on the database where necessary.

Table 2 shows the upper and lower limits specified for various income sources and the total number of amount responses and the number of responses that fell out of limits. There were about 9.1 million

amount entries, of which about 96,000, or 1.0%, were manually examined. About 44,000 source amounts were modified. The largest number of adjustments were made to wages and salaries. However, considering the very high incidence of this source among income recipients, the proportions of records examined and changed were quite small. The adjustments to various sources of government transfer payments may seem substantial, but most of these result from a tendency on the part of many respondents to report incomes from two sources (for example OAS and CQPP) against a single source.

**Table 2. Income Outliers (Sample Counts), 1991 Census**

Source of income	Limits		Responses with amount	Responses outside limits and examined		Responses changed		
	Upper	Lower		Number	%	Total	Percent of	
	\$	\$	Number				Total	Examined
Wages and salaries	125,000	0	2,445,644	15,004	0.6	6,449	0.3	43.0
Non-farm self-employment	125,000	-30,000	169,513	6,229	3.7	2,483	1.5	39.9
Farm self-employment	75,000	-20,000	66,782	2,960	4.4	1,458	2.2	49.3
Old Age Security pension and Guaranteed Income Supplement	12,500	0	475,624	10,572	2.2	5,980	1.3	56.6
Canada/Quebec Pension Plan benefits	10,000	0	474,243	7,542	1.6	5,037	1.1	66.8
Unemployment insurance benefits	19,000	0	383,323	2,898	0.8	2,942	0.8	101.5
Other income from government sources	20,000	0	336,790	7,146	2.1	4,327	1.3	60.6
Investment income	50,000	-10,000	1,037,189	13,757	1.3	3,076	0.3	22.4
Retirement pensions	40,000	0	279,184	6,504	2.3	2,556	0.9	39.3
Other money income	30,000	0	194,024	3,507	1.8	1,691	0.9	48.2
Total income	150,000	-30,000	3,259,205	19,500	0.6	8,293	0.3	42.5
<b>Total Amount Responses</b>			<b>9,121,521</b>	<b>95,619</b>	<b>1.0</b>	<b>44,292</b>	<b>0.5</b>	<b>46.3</b>

Respondents reporting amounts for Old Age Security (OAS) pension and Guaranteed Income Supplement (GIS) in excess of their 1990 entitlement caused the most common error among the transfer payment sources. This over-reporting was often due to one of the following reasons:

- OAS/GIS pension was combined with Canada/Quebec Pension Plan (C/QPP) benefits;
- OAS/GIS pension was combined with provincial income supplements;
- one spouse reported OAS/GIS for both spouses;
- some individuals, who turned 65 in the later part of 1989, might have received and reported some arrears related to 1989;
- some individuals, under the age of 60, misreported another transfer payment or a retirement pension in this source.

All cases of reporting over \$12,500 as OAS/GIS were examined during head office processing and either manually resolved at this stage or left for automated edit and correction. For example, certain individuals who multiplied their current (June, 1991) OAS/GIS payment by 12, to arrive at their annual amount for 1990, had their over-reporting corrected during automated processing (see Edit and Imputation).

Upon completion of the updates and corrections required in this processing phase, the income data were then transferred to the next phase in processing, namely, edit and imputation.

## V. Edit and Imputation

This section provides a brief description of the procedures followed and systems used during the edit and imputation of census data. The specific procedures followed for the edit and imputation of the income variables is described in detail thereafter.

### 1. General

In the edit and imputation phase, all errors, discrepancies, inconsistencies and missing answers are identified and corrected (including imputation) by a fully automated series of computer programs. The final set of usable "clean" data (free of invalid, inconsistent and missing responses) is produced, comprising a unique database which provides the most detailed information on Canada's population and its characteristics, ranging from the national to the neighbourhood level.

Errors found at this stage can be the result of respondents answering the questions incorrectly or incompletely, or they can be due to errors generated during coding activities and data capture. After errors are detected, values for missing or incomplete entries are imputed. Imputation is done using either a "deterministic" or a "hot deck" method. For deterministic imputation, errors are corrected by inferring the appropriate value from answers to other questions. The "hot deck" approach selects a record that has a number of characteristics in common with the record in error, and imputes the missing information from this "donor" record.

One in every five households, or 20% of the population, received a Form 2B comparing additional socio-economic questions. To derive estimates for the population, a weighting algorithm was developed. The procedure used to weight sample data in 1991 is known as the "Generalized Least Squares Estimation Procedure (GLSEP)". The GLSEP begins with initial weights of approximately 5 and then, using basic census information known for every person, i.e. age, sex and marital status, adjusts them to obtain the desired agreement between the sample estimates and the population counts. Once data are finalized and weights are calculated, final data are transferred to Statistics Canada's retrieval databases; these databases are used to produce the published and custom products.

### 2. Overview of Income Processing

During this phase of income processing, it was assumed that most respondents completed their census questionnaires (including the income questions) as accurately as possible. This assumption stems partly from Statistics Canada's philosophy of trust in respondents and partly from the nature of census income data. Although there are known relationships between income and some other census variables, these are not simple linear relationships. Furthermore, the time-lag between some of these variables (for example, current occupation or class of worker in June 1991 and income in 1990) does not allow verification of some of the apparent inconsistencies.

The edit and imputation phase of income processing consisted of using a system which edited the reported values for selected income sources against specified criteria, checked for reasonable consistency, on the one hand, among income sources and, on the other, between income and other variables, imputed data for non-response cases from an established pool of donor records and, finally, derived new income variables.

The processing system employs a set of highly complex and technical operations. The description in this section has been kept, as much as possible, both brief and non-technical. The order in which the various operations are described has been adopted for ease of reference and does not follow the actual system. Users interested in greater detail may refer to other documents or get in touch with the subject-matter experts at Statistics Canada.

In very broad terms, the entire process consists of the following parts:

#### (a) Determination of Income Processing Universe

As previously mentioned, no income data was requested from individuals aged less than 15 years, from persons who immigrated to Canada in 1991, or from residents of institutions. For these individuals, any reported income was removed and all sources and total income were set to zero. The income reported by members of Hutterite colonies was also removed because of the known inconsistencies of

reporting of income among these colonies. Thus, once any income reported by the individuals described above was 'zeroed out', they were excluded from further processing. The remainder of the records went through the processing stream for income.

**(b) Determination of Response to Question on Income Sources**

The response status of total income and of each of the sources listed on the questionnaire was classified into five categories.

**(c) Determination of Response to Income Question**

The response status of each income record as a whole was determined by examining the information provided in total income, income sources and certain related variables. All records were classified into nine categories.

**(d) Edit and Assignment of Sources**

Information provided for the ten income sources listed on the 1991 Census questionnaire was edited for consistency, and for correction or assignment where necessary.

**(e) Assignment for Non-response**

All records were stratified on the basis of certain important income-related characteristics and divided into "donors" and "recipients" according to their response status. Complete and partial non-response cases were dealt with separately.

**(f) Derivation of Final Variables**

Once the reported income sources were finalized through edits and assignments, family allowances and child tax credits were estimated and assigned. Total income of each individual was then calculated as a sum of the amounts of its constituent sources, and other related income variables were derived.

### 3. Edit and Assignment of Individual Income Sources

Many respondents leave an income source blank if they consider that the source is inapplicable to them. For example, young respondents tend to leave sources concerning retirement pensions (public or private) blank. As a first step, therefore, the responses on the questionnaire for individual income sources were examined in combination with the response to total income, and each income source was placed in one of the following four categories:

**AMOUNT** - Reported an amount (negative in some cases).

**PARTIAL** - Indicated receipt of income without providing an amount.

**ZERO** - Gave a clear indication of no income from the source.

**BLANK** - Left the source blank.

Derived in the above manner, the response rates to the individual sources, other than wages and salaries, ranged from 81% to 83%. In the case of wages and salaries, 87% of the individuals in the edit universe had responded to the question.

Since there is a wide variance in the incomes reported by individuals with similar characteristics, editing of most income sources against pre-specified "standards" is not possible. For these reasons, individual sources were edited only for obvious inconsistencies. However, the amounts reported against various sources of government transfer payments were compared with the existing administrative standards and adjustments were made where necessary. These edits of sources were undertaken initially, and were repeated after imputation for non-response had been completed, to guard against any inconsistencies as a result of imputation.

**(a) Total Income**

The information provided by respondents against this item was used as a control during most of the automated processing of income data. The amounts reported as total income were edited in conjunction with the responses provided to the sources of income, as follows:

- (i) In all cases where respondents provided amounts for total income and one or more sources of income, the system compared the sum of reported sources and the total income. Just over nine out of ten individuals who reported an amount against total income also provided an amount response to one or more sources of income, and there was no difference between their sum of sources and total income. Because of the non-capture of reported cents, a difference of plus or minus \$10 was ignored and the reported total income was replaced by the derived sum of sources.
- (ii) If the difference between the sum of their reported sources and their total income was greater than ten dollars, an edit was undertaken to check if the difference equalled their reported wages or income from non-farm self-employment. (Some respondents tended to report their 'gross' earnings in wages and 'net' earnings in self-employment). If so, one of the components was removed.
- (iii) In cases where the sum of sources was less than the reported total income, it was assumed that the respondent had missed reporting at least one source of income. Where negative income was reported against one of the sources, the reported total income was replaced by the derived sum of sources, keeping in view the possibility of errors of addition in such cases. The remaining records in this group were separated for assignment of missing sources.
- (iv) In all other cases where the respondents reported their total income, they only partially answered for income sources or left them blank. Where only one source was partially responded to or left blank, the reported total income was assigned to the single indicated source. The edit, however, ensured that excessive values were not assigned to government transfer payment sources or that negative total income values were only assigned to a source in which a loss could have been incurred. The remaining records in this group were earmarked for assignment of source data.

Whenever an amount was changed in one of the sources during edit and imputation, the total income field was automatically adjusted.

**(b) Wages and Salaries**

This is the most important source of income in terms both of incidence and share of total income. Except for two checks, the reported amounts were accepted. First, as already stated above, a check for duplicate reporting of wages and non-farm self-employment income was undertaken, which might have led to the deletion of wages and salaries in certain cases. Secondly, in cases of obvious misreporting of non-farm self-employment income against wages, the amount was transferred from the former to the latter source without affecting reported total income.

**(c) Net Non-Farm Self-Employment Income**

Other than the impact of editing of total income and wages and salaries, as explained above, no other changes were made to this source during editing.

**(d) Old Age Security Pension and**

Guaranteed Income Supplement

As explained earlier, head office processing dealt with all cases where the reported amount for Old Age Security pension and Guaranteed Income Supplement benefits exceeded \$12,500. An analysis of inconsistencies indicated that editing of this field often involved changes to Canada/Quebec Pension Plan and other government transfer payments.



To begin with, the existing amounts in this field were edited, and changed where necessary, as follows:

- (i) If the reported amount equalled 12 times the current monthly (June 1991) entitlement, it was changed to the actual 1990 entitlement.
- (ii) If the reported amount exceeded the actual OAS/GIS entitlement, the excess was transferred, as appropriate, to either the "other government income" (as a provincial income supplement) or C/QPP sources, or to both.
- (iii) If a respondent reported OAS/GIS income but did not meet the age, marital status and residence requirements, the reported amount was transferred to C/QPP benefits if the respondent was eligible for such benefits. Otherwise, the amount was transferred to other government transfer payments.
- (iv) If the editing of C/QPP benefits clearly indicated that a respondent reported the OAS/GIS income against that source, it was transferred to OAS/GIS.

Once all sources had been edited and assignment for non-response was concluded, the entire file was passed through a routine to ensure that Old Age Security and Guaranteed Income Supplement were not assigned to an ineligible individual. Furthermore, while all persons aged 65 years and over in 1990 were entitled to Old Age Security (OAS), the entitlement to the Guaranteed Income Supplement (GIS) was dependent on the respondent's income from other sources in the previous year. In the case of married couples, the amount of GIS depended on the combined income of husband and wife. Also, 60- to 64-year-old spouses of OAS recipients were entitled to a Spouse's Allowance (SPA) and 60- to 64-year-old widow(er)s were entitled to a Widowed Spouse's Allowance (WSPA). Finally, individuals not born in Canada had to fulfil certain residence requirements before becoming entitled to OAS/GIS benefits.

To meet these various conditions, a relatively complex system, which took into account age, immigration status, family status, and individual/spousal income was developed and, on the basis of 1990 administrative entitlements, an OAS/GIS/SPA entitlement was calculated for each individual. If the respondent reported more than this estimated entitlement against OAS/GIS, no action was taken. In all other cases, the calculated amount replaced the existing amount against OAS/GIS.

#### (e) **Canada/Quebec Pension Plan Benefits**

There is a wide variety of both the types of C/QPP benefits and recipients, which makes it difficult to do a consistency edit of this source. The benefits stem from the contributions, calculated as a percentage of earnings, made by employed persons during their working lives. In some cases, respondents reported their C/QPP "contributions" rather than their benefits for this source. Where this was so established, the amount was deleted. Furthermore, as already explained, where respondents over the age of 65 in 1990 reported their exact OAS/GIS entitlement against these benefits and reported zero OAS/GIS income, the amount was transferred to OAS/GIS. Similarly, reported amounts against this source by other elderly respondents who were not considered eligible for these benefits or amounts in excess of administrative entitlements were transferred to OAS/GIS to the extent of their entitlement, and any remaining excess to "other government income".

#### (f) **Unemployment Insurance Benefits**

Some respondents erroneously reported their unemployment insurance contributions rather than the unemployment insurance benefits received by them. These were removed in a manner similar to the misreported contributions to C/QPP.

Evaluation of income data from the 1981 and 1986 Censuses revealed that the incidence of unemployment insurance benefits was substantially lower than indicated by relevant administrative data. Since the census did not collect information on weeks of unemployment during the reference year, it was not considered feasible to undertake changes to this source during processing. An examination of the reported data on unemployment insurance benefits from the 1991 Census revealed

that the situation had not improved and that a significant number of recipients did not report their benefits on the 1991 Census questionnaire.

On the basis of an analysis of relevant data from different sources, a separate process to impute these benefits to non-respondents was designed. As a first step, a processing universe was established. Excluded from this universe were individuals who:

- were accepted to be without income after assignment for total non-response;
- had worked 49 to 52 weeks in 1990 or who had never worked;
- were overseas;
- were less than 19 or over 65 years of age; and
- belonged to a class of worker ineligible for UI benefits.

The remaining individuals were divided into two groups: recipients and non-recipients of UI benefits. Each group was classified into 22 strata on the basis of sex, age, weeks worked and class of worker. Imputation was carried out within each stratum and, where applicable, more detailed categories of age and weeks worked were used as auxiliary matching constraints.

**(g) Family Allowances**

Although family allowances and child tax credits are included in the census income concept, no information on these was collected from respondents. Instead, family allowances were calculated on the basis of the number of eligible children in the family and federal-provincial rates, and were assigned to the parent with the higher total income in 1990 (or to the lone parent).

**(h) Federal Child Tax Credits**

Since payment of federal child tax credits is dependent on parental 'net income', a complex formula based on income tax statistics was used to derive net income. The federal child tax credits were then calculated on the basis of the number of eligible children in the family and the derived parental net income, and were assigned to the parent with the higher total income in 1990 (or to the lone parent).

**(i) Other Income from Government Sources**

This source of income consists of all transfer payments other than those listed above, received from federal, provincial or municipal governments in 1990, and is prone to under-reporting. Because of the large number of programmes involved and the criteria for their applicability, it is impossible to undertake a thorough edit of this component.

In 1990, Nova Scotia, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, the Yukon and the Northwest Territories provided benefits to elderly recipients. These provincial income supplements were estimated for each individual based on the diverse eligibility rules used by each province (usually associated with OAS and/or GIS entitlements). If the reported income for "other income from government sources" was higher than the calculated supplement, no action was taken. In all other cases, the calculated entitlement replaced the reported value.

**(j) Net Farm Self-employment Income, Investment Income, Retirement Pensions and Other Money Income**

Other than the impact of editing of total income, no specific edit for these sources was undertaken.

#### 4. Imputation for Income Non-response

To provide for the missing income data, three steps were undertaken. First, all individuals were given a record response code according to the type of their response to income questions. Secondly, all records were divided into "donors" (respondents) and "recipients" (non-respondents) and were, at the same time, classified into a set of homogeneous strata. Finally, "donors" and "recipients" were matched to obtain missing income data.

##### (a) Record Response Code

All individuals were divided into nine groups, with each given a record response code as follows:

**RC1** - These records had no income and were not used as donors for the imputation of data to non-respondents.

**RC2** - These were respondent records (with zero income) and were part of the donor universe, along with those of income recipients, for non-respondent records whose income status could not be determined (see RC4 below).

**RC3** - These were respondent records (with income) and were part of the donor universe for non-respondent records coded RC4; they constituted the entire donor universe for non-respondent records coded RC5 to RC9.

**RC4** - These were non-respondent records for persons who may or may not have had income in 1990. These records were assigned complete income data from RC2 and RC3.

**RC5** - These were non-respondent records for persons who received an unknown income in 1990. These records were assigned complete income data from RC3 records.

**RC6** - These records provided an amount for respondents' total income only. These records were matched with an RC3 record with similar total income for complete assignment of income data.

**RC7** - These records provided an amount for total income as well as for some sources but, at the same time, did not give a response for some of the sources. A procedure similar to that for records coded RC6 was adopted, except that the recipient record was assigned data for only those sources which were "partial" or "blank". In other words, an amount already reported against a source was not replaced.

**RC8** - These records were similar to those coded RC7, except that information was provided for employment income sources only, but not for total income. These records were treated in the same manner as those coded RC7, except that the matching of non-respondents was undertaken on the basis of reported employment income, rather than total income.

**RC9** - These records were without an amount reported in either the three employment income sources or in the overall income total. These were treated in a manner similar to those coded RC5, except that the recipient was assigned data for only those sources which were "partial" or "blank".

For results derived in the above manner, about 82% of all individuals who should have responded to income questions provided complete information, 8.2% provided only partial information and 9.9% were completely non-respondent. Table 3 gives a breakdown by record response codes.

**Table 3. Distribution of Population 15 Years and Over by Type of Response to Income, 1991 Census**

Record response code	Type of response	Response rate
	<b>Respondents</b>	<b>82.0</b>
RC1-2	Without income	8.1
RC3	With income	73.9
	<b>Partial respondents</b>	<b>8.2</b>
RC6	Only total income reported, no information on source	4.9
RC7	Total income reported and sources indicated without amount	1.2
RC8	Employment income reported but total income not reported	0.9
RC9	With income, sources indicated without amount	1.3
	<b>Non-respondents</b>	<b>9.8</b>
RC4	Indeterminate, no information provided	7.7
RC5	With income, no other information	2.1
	<b>Total</b>	<b>100.0</b>

**(b) Stratification**

The income of a non-respondent retired person is, other things being equal, likely to be similar to that of another retired person. Again, two persons aged between 30 to 35 years, with university degrees and working full year full time in 1990, are likely to have similar incomes. It is, therefore, logical to match non-respondents (recipients) and respondents (donors) with as many common characteristics as possible.

Partial respondents (records coded RC6, RC7 and RC8), where total or employment income was given but some source information was missing (and respondent records coded RC3) were divided into three strata: one each for the aboriginal, non-aboriginal and overseas populations. Within each stratum, an attempt was made to further match the donor-recipient pair on the closeness of their given total or employment incomes (seven groups), age (three groups), work activity (worked or did not work in 1990) and class of worker (paid worker/unpaid family worker, non-farm self-employed or farm self-employed).

For complete non-respondents, the operation was much more complex. Both respondents (records coded RC2 and RC3) and complete non-respondents (records coded RC4, RC5 and RC9) were divided into 113 homogeneous strata as follows:

- (i) The non-aboriginal population in Canada was stratified into 75 groups based on age (10-year age groups), work activity (weeks worked in 1990), work effort (full-time or part-time), class of worker (paid workers, non-farm self-employed, farm self-employed or unpaid family workers), and census family status (husbands or male lone parents, female lone parents, wives, children, non-family persons and all others);
- (ii) The aboriginal population in Canada was stratified into 34 groups based on age (10-year groups), work activity (weeks worked in 1990), work effort (full-time or part-time), class of worker (paid workers, self-employed, all other workers), census family status (husbands or male lone parents, female lone parents, wives, children, non-family persons and all others) and reserve status (on- or off-reserve);
- (iii) The Canadians outside the country were stratified into 6 groups based on age (15-65 and 66 and over), work activity (worked or did not work in 1990) and census family status (husbands or lone parents, wives, children, non-family persons and all others).

To further improve the donor-recipient similarity, each of the 113 strata was divided into smaller groups, where appropriate, on the basis of sex, detailed age groups, education (with or without a university degree), occupation (above- or below-average income occupation) and full- or part-time work.

**(c) Imputation**

Each non-respondent (recipient) was paired with a respondent (donor) with matching additional characteristics within each stratum. If an exact match could not be found, then the additional matching constraints were relaxed, but imputation was always carried out within the stratum. Once the best match for a recipient was found, the non-respondent was assigned the income sources and total income of the donor record. In the case of non-respondents who initially provided either (a) employment income sources or (b) non-employment sources or (c) total income only, just the missing source information was taken from the donor record.

In all cases of imputation, the processing system ensured that the donor and recipient records were located geographically as close as possible.

## **5. Derived Income Variables**

As a last step in the processing of income variables, a few variables, already defined in Section 3 above, were derived. A few points need to be noted:

- (a) As stated earlier, the most important of these variables is, of course, 'total income'. In a few cases, the sum of positive and negative incomes from various sources amounted to zero. It was considered important to differentiate these cases from true zero-income records. Accordingly, these records were assigned one dollar in their total income field.
- (b) It should be noted that the total income of census families, economic families and households is derived only for persons in private households in Canada.
- (c) In addition to (b) above, the income status variable indicating the position of a unit in relation to low income cut-offs does not apply to the population in the Yukon, the Northwest Territories and on Indian reserves.

## **6. Impact of Edit and Imputation on Income Estimates**

As stated at the outset of this section, the objective of edit and imputation was not to 'create' data but to ensure the reasonable accuracy and consistency of the data supplied by the respondents. With this objective in view during each of the many phases of edit and imputation, a record was kept of all changes made to the data. **Table 4** gives the original and the final number of income recipients and the amount received from income source.

**Table 4. Impact of Edit and Imputation on the Number of Income Recipients and Their Aggregate Income (Sample Statistics), by Source of Income, 1991 Census**

Source of income	Number of income recipients			Aggregate amount received		
	Original	Final	Change	Original	Final	Change
	'000		%	\$'000,000		%
Wages and salaries	2,429	2,868	18.1	59,189	67,733	14.4
Non-farm self-employment	167	216	29.2	3,334	4,626	38.8
Farm self-employment	65	77	19.3	567	679	19.9
Old Age Security pension and Guaranteed Income Supplement	472	573	21.4	2,176	3,258	49.7
Canada/Quebec Pension Plan benefits	471	557	18.3	1,834	2,167	18.2
Unemployment insurance benefits	380	583	53.3	1,543	2,369	53.5
Family allowances	-	775	100.0	-	642	100.0
Child tax credits	-	475	100.0	-	463	100.0
Other income from government sources	333	683	105.0	1,620	2,290	41.4
Investment income	1,027	1,223	19.1	5,001	5,923	18.4
Retirement pensions	278	330	18.6	2,745	3,214	17.1
Other money income	186	222	19.6	698	837	20.1
<b>Total Income</b>	<b>3,590</b>	<b>3,993</b>	<b>11.2</b>	<b>83,707</b>	<b>93,097</b>	<b>11.2</b>

The table shows the impact of edit and imputation on both the number of recipients and aggregate income from each source. At the end of the process, both the number of income recipients and the aggregate amount of income increased by 11.2%. While the proportion of income assigned for most sources is commensurate with the proportion of records imputed, the following points should be kept in mind when examining data in Table 4:

- The changes to non-farm self-employment income include those resulting from the edit between class of worker and reported employment income sources, as discussed earlier. Excluding this edit, the number of recipients with this source increased by 12.0% and the corresponding aggregate amount increased by 11.6%.
- As was explained earlier, no information was collected on family allowances and child tax credits, both of which were estimated and assigned to those entitled to receive them.
- Aggregate old age security pension and guaranteed income supplement benefits increased by nearly 50% during the course of processing. Three-quarters of this amount was assigned after imputation for non-response to bring individuals up to administrative entitlement levels, given individual or spousal total income, as explained under "Edit and Assignment of Individual Sources".
- The changes to unemployment insurance benefits for the 1991 Census include the impact of the new procedure to edit and impute benefits to non-respondents separately, as explained in the text. Excluding the impact of this new procedure, the number of recipients would have increased by 11.5% and the aggregate benefits by 11.4%.
- The large proportion of individuals with other income from government sources assigned or imputed is largely due to the assignment of provincial income supplements to recipients of Old Age Security pension and Guaranteed Income Supplement payments. Since these imputed amounts were relatively small, the resulting proportion of aggregate income assigned was smaller than the proportion of recipients assigned.

## VI. Data Evaluation

### 1. General

Throughout the census-taking process, care was taken to ensure high-quality results. Rigorous quality standards were set for data collection and processing, and the Public Communications Program assisted in minimizing non-response. A Data Quality Measurement program was established to provide users with information on the quality of census data.

Although considerable effort is made throughout the entire process to ensure high standards of data quality, resulting data are subject to a certain degree of inaccuracy. To assess the usefulness of census data for their purposes and to understand the risk involved in drawing conclusions from or basing decisions on these data, users should be aware of their inaccuracies and appreciate their origin and composition.

An error can arise at virtually any stage of the census process, from preparation of materials to data collection and processing. Some errors occur at random and tend to cancel each other out when individual responses are aggregated for a large group. For errors of this nature, the larger the group the more accurate the corresponding estimate, and therefore it is important to be cautious when dealing with estimates derived using small aggregated groups of responses. On the other hand, some errors occur more systematically and are more serious for data users than random errors.

For census data in general, the principal types of errors are as follows:

- **Coverage Errors**

Occur when individuals and/or dwellings are missed, incorrectly included, or double-counted.

- **Non-response Errors**

Occur when responses are not available from some households and/or individuals due to extended absence or for other related reasons.

- **Response Errors**

Occur when respondents, or in some instances census representatives, misinterpret a census question and record an incorrect response.

- **Processing Errors**

Can occur during **coding**, when write-in responses are transformed into numerical codes by clerks or by the automated coding system, during **data capture**, when responses are transferred from questionnaires to computer tapes by key-entry operators, and during **imputation**, when a valid, but not necessarily correct, response is inserted by the computer into a record to replace missing or invalid data.

- **Sampling Errors**

Only apply to supplementary questions on the long (2B) questionnaire, asked of only a twenty percent (20%) sample of households, and arise due to the fact that they are weighted to represent the whole population and inevitably differ somewhat from results that would have been obtained had the questions been asked of the total population.

All of the above errors have both random and systematic components. Usually the systematic component of sampling error is very small in relation to the random component. For other non-sampling errors, both random and systematic components may be significant.

**Four studies were undertaken to measure coverage errors:**

- Vacancy Check
- Temporary Residents Study
- Reverse Record Check
- Overcoverage Study

**Two studies were conducted to evaluate response errors:**

- Reverse Record Check Content Study
- Overcoverage Content Study

**Four studies were undertaken to evaluate the effect of sampling errors on the sample data:**

- Sampling Bias Study
- Weighting Evaluation
- 2A/2B Consistency Study
- Sampling Variance Study

On some Indian reserves and settlements (a total of 78), enumeration was not permitted or was interrupted before its completion, or the quality of collected data was considered to be inaccurate. These areas are called **incompletely enumerated Indian reserves and Indian settlements**. Under these circumstances, data are not available for these areas and are not included in tabulations. Where necessary, explanatory notes have been provided. Caution should be exercised when analyzing data from areas affected by incomplete enumeration, especially in small areas where the impact is the greatest.

## **2. Data Evaluation and Quality of Income Estimates**

Before data are released, an evaluation is undertaken with respect to their quality. In fact, however, the qualitative aspect of the data is considered throughout the processes described earlier in this document. Thus, the editing of amounts against maximum limits during head office processing is carried out towards this end. (See Table 2.) The first step in automatic processing is to determine the nature of the response to income questions. (See Table 3.) Again, during edit and imputation, audit trails are instituted to keep a record of changes made. (See Table 4.)

Once the data have been finalized, an overall evaluation is undertaken before release. This evaluation consists of reconciliation of census income statistics with other sources of similar data. The results of two such reconciliations are summarized below.

### **(a) Census and National Accounts**

The final estimates of 1990 income derived from the 1991 Census were evaluated in relation to 1990 personal income estimates in the national accounts. Before the evaluation, however, it was necessary to make adjustments for differences of concepts and coverage in the two sources. For example, personal income estimates include supplementary labour income in wages, but census estimates are for actual wages received. The results of the evaluation are shown in Table 5.



**Table 5. Comparison Between Census Income Estimates and Adjusted Personal Income Estimates, Canada, 1990**

Source of income	Census income estimates 1	Personal income estimates 2	Difference	
			Absolute (1-2) (millions)	Relative ((1-2)/2)100 %
Wages and salaries	335,948	334,604	1,344	0.4
Non-farm self-employment	23,291	23,239	52	0.2
Farm self-employment	3,438	3,291	147	4.5
Investment income	30,083	60,398	-30,316	-50.2
Old Age Security pension	15,544	15,540	4	0.0
Canada/Quebec Pension Plan benefits	10,775	12,319	-1,544	-12.5
Family allowance	3,055	3,184	-129	-4.1
Unemployment insurance benefits	11,417	13,119	-1,702	-13.0
Other income from government sources	10,386	22,308	-11,922	-53.4
Employment income	362,677	361,134	1,543	0.4
Non-employment income	81,259	126,862	-45,603	-35.9
<b>Total Income</b>	<b>443,937</b>	<b>488,002</b>	<b>-44,060</b>	<b>-9.0</b>

Note: (1) Total income consists of comparable sources in the census and national accounts estimates; it excludes child tax credits, retirement pensions and other money income.

(2) Totals may not add due to rounding.

The overall census estimates of aggregate income from comparable sources were just over 90% of similar National Accounts estimates. There was, however, substantial variation in the results of comparisons of individual sources.

The three components of employment income were larger than the comparable estimates in the National Accounts. Census estimates of wages and salaries, the most important source of income, were higher by 0.4%. Non-farm self-employment income and farm self-employment income were higher, respectively, by 0.2% and 4.5%. On the whole, the estimates of employment income from the census were 100.4% of comparable National Accounts estimates.

The census estimate of Old Age Security pensions was also close to National Accounts estimates, but the aggregates for Canada/Quebec Pension Plan benefits and other government transfer payments were underestimated to a larger degree. The "other government transfer payments" include income from a very large variety of transfer programs, and the adjustments made for conceptual equivalence were only approximate. Furthermore, a 'catch-all' category like 'other' is generally subject to under-estimation. Finally, there was a very large discrepancy between estimates of investment income in the census and in the National Accounts. The underestimation in the census (and the surveys) of this source of income is a common phenomenon in Canada and elsewhere.

#### (b) Census and Survey of Consumer Finances

Census income statistics were also compared with similar statistics from the Survey of Consumer Finances. An identical income concept is used in the census and the Survey, but there are differences

of coverage. The Survey does not cover the population in the Yukon, the Northwest Territories, Indian reserves and outside Canada. Adjustments were made to the census data for these differences before undertaking comparisons with the Survey data.

National and provincial income size distributions of different population groups such as individuals and families were compared from the two sources. Similarly, the incidence of low income among economic families and unattached individuals was compared according to different characteristics. The average incomes of individuals in each province, shown in Table 6, were also compared.

The results of these comparisons indicated a very good reconciliation between the census and Survey income statistics.

**Table 6. Percentage Distribution of Individuals 15 Years and Over, Income Recipients and Their Aggregate Income, and Their Average Income, by Province, Census and Survey of Consumer Finances, 1990**

Province	Population 15 years and over		Income recipients		Aggregate income		Average income	
	Census %	Survey %	Census %	Survey %	Census %	Survey %	Census \$	Survey \$
Newfoundland	2.1	2.1	1.9	2.0	1.5	1.5	18,717	17,674
P.E.I.	0.5	0.5	0.5	0.5	0.4	0.4	19,042	17,857
Nova Scotia	3.3	3.3	3.2	3.3	2.8	2.9	20,655	20,455
New Brunswick	2.7	2.7	2.6	2.7	2.1	2.1	19,745	18,772
Quebec	25.7	25.8	25.1	25.4	23.4	23.8	22,395	21,760
Ontario	37.5	37.2	37.9	37.5	41.3	40.5	26,215	25,181
Manitoba	3.9	3.9	3.9	4.0	3.5	3.5	21,379	20,789
Saskatchewan	3.4	3.5	3.5	3.5	3.0	3.1	20,908	20,271
Alberta	9.0	9.0	9.2	9.1	9.3	9.4	24,498	23,906
British Columbia	12.1	12.0	12.2	12.1	12.6	12.9	24,852	24,881
<b>Canada</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>24,030</b>	<b>23,302</b>

## VII. Historical Comparability

### 1. General

To analyze historical trends based on census data, it is important to note the changes which took place from one census to another in respect of both content, collection and processing of data. In the past, the censuses of Canada have undergone continual change to meet the ever-changing needs of Canadians for timely and accurate information on Canada's statistical profile. This versatile perspective continued in 1991.

The census questionnaire was completely redesigned for the 1991 Census. The following changes were made since the 1986 Census:

- Twelve (12) questions not asked in the 1986 Census appear on the 1991 Census questionnaire;
- Of these twelve (12) questions, seven (7) appeared for the first time and five (5) were reinstated from previous censuses;
- Four (4) questions found on the 1986 Census questionnaire were excluded from the 1991 Census questionnaire;
- Two (2) new census questionnaires were added in 1991 (Form 2D - Canvasser Questionnaire, and Form 3B - Soup Kitchen Questionnaire).

Form 2D was introduced to enumerate remote northern areas and Indian reserves. It contained the same questions as the Form 2B, but was set up to be administered in a person-to-person environment. Form 3B, an experimental pilot questionnaire, consisted of eleven (11) questions. Interviews were conducted on a person-to-person basis, in a sample of soup kitchens in major Canadian cities, to enumerate persons not counted by traditional enumeration techniques.

For the first time since 1941, both **permanent and non-permanent residents** of Canada were enumerated. A growing segment of Canada's population, non-permanent residents can create a demand for government services such as schooling, language training, health care, and employment programs. Users should be careful when comparing data from 1991 and previous censuses.

### 2. Historical Comparability of Income Data

#### (a) Content and Coverage

The Canadian censuses have a long tradition of collecting some income data. A question on wages and salaries has been asked in every census taken in the present century. However, prior to 1961, census income data were limited to wages and salaries, and no information was collected on income from any other source such as self-employment, investments, retirement pensions, or government transfer payments.

The 1961 Census collected, for the first time, information on total income by source of income, i.e. both earnings from employment and other income. However, the 1961 Census did not ask a question on income from farming. Moreover, for income purposes, the coverage in the 1961 Census was restricted to a sample of non-farm private households and excluded households in the Northwest Territories. The income reference period in the 1961 Census covered the 12 months immediately preceding the census or, if income information could not be provided for that time period, the previous calendar year, i.e. 1960.

The 1971 Census was the first to collect, from a sample of all households, complete information on income from all sources during the previous calendar year. The total income concept was identical in the 1981, 1986 and 1991 Censuses, although there were differences in the number and combination of

questions asked on the sources of income. These later censuses, however, excluded the population resident in institutions.

Thus, in terms of content, coverage and reference period, income data from the 1961 and earlier censuses are generally not comparable to data from the 1971, 1981, 1986 and 1991 Censuses. Income data from the 1971 Census can be compared to those from the later censuses after adjustments for content and coverage have been made. While the 1981, 1986 and 1991 Censuses are identical in terms of income content, the 1991 Census differs slightly from previous censuses in terms of coverage. Persons in Canada on student authorizations, employment authorizations, and Minister's permits, and as refugee claimants, were enumerated in the 1991 Census but not in previous censuses. These persons, as noted earlier, are referred to as non-permanent residents.

Figure 4 provides the relevant details about income sources, reference period, etc., for the 1961, 1971, 1981, 1986 and 1991 Censuses.

**Figure 4. Income Content and Coverage in the Censuses of Canada**

	Census				
	1961	1971	1981	1986	1991
<b>Sources</b>					
Wages and salaries	Yes	Yes	Yes	Yes	Yes
Net non-farm self-employment	Yes	Yes	Yes	Yes	Yes
Net farm self-employment	No	Yes	Yes	Yes	Yes
Family allowances	Yes	Yes	Yes	Yes	Yes
Federal child tax credits	No	No	No	Yes	Yes
Old Age Security (OAS) and Guaranteed Income Sup. (GIS)		Yes <sup>1</sup>	Yes <sup>2</sup>	Yes	Yes
Benefits from Canada/Quebec Pension Plan (C/QPP)		See fn 1	See fn 2	Yes	Yes
Benefits from unemployment insurance		<sup>3</sup>	Yes	Yes	Yes
Other income from government sources	Yes	Yes	Yes	Yes	Yes
Interest and dividends	Yes	Yes	<sup>4</sup>	See fn 4	See fn 4
Other investment income	Yes	Yes	See fn 4	See fn 4	See fn 4
Retirement pensions, superannuation, annuities	Yes	Yes	<sup>5</sup>	Yes	Yes
Other money income	Yes	Yes	See fn 5	Yes	Yes
<b>Reference Period</b>	Jun'60-May'61	1970	1980	1985	1990
<b>Sample Size</b>	20%	33%	20%	20%	20%
<b>Coverage</b>	<sup>6</sup>	All	<sup>7</sup>	See fn 7	<sup>8</sup>

<sup>1</sup> Includes OAS, C/QPP and provincial old age assistance.

<sup>2</sup> Includes C/QPP benefits, but provincial income supplements are included in "Other income from government sources".

<sup>3</sup> Included in "Other income from government sources".

<sup>4</sup> Includes all investment income.

<sup>5</sup> Included with "Other money income".

<sup>6</sup> Excludes farm households and households in the Northwest Territories.

<sup>7</sup> Excludes institutional population.

<sup>8</sup> Excludes institutional population; includes non-permanent residents.

**(b) Current Versus Constant Dollars**

The average income of a family in 1970 was \$9,600; it increased to \$26,700 in 1980, to \$37,800 in 1985 and to \$51,342 in 1990. Thus, family income increased by 178% between 1970 and 1980, by 42% between 1980 and 1985 and by 36% between 1985 and 1990. However, the value of the dollar also changed during this period. When the changes in the purchasing power of a dollar are taken into account, family income increased by 28% between 1970 and 1980, dropped by about 1% between 1980 and 1985, and increased by 9% between 1985 and 1990. It is, therefore, important to take this factor into account when comparing incomes over time. One method to do so is to adjust incomes by changes in the consumer price index over the period.

## VIII. Products and Services

The national census is an extremely rich source of data on many aspects of Canadian life. These data are a major input towards many important business and policy decisions. These data are used in the analysis of a variety of demographic, social and economic phenomena. However, it is not always possible, at least in terms of cost, for every user to obtain made-to-measure data. Keeping this difficulty in view, Statistics Canada places in the public domain a series of products for use by Canadians. These products consist of both hard copy publications as well as machine-readable material.

The census results are published in a set of data and analytical series. Income is one of the most important variables, and occupies a significant part of these series. Furthermore, income data are often included even in publications on subjects other than income. While it is not possible, due to space limitations, to list the complete contents of these publications, this section provides a summary of the available data on income.

### 1. Nation Series

The series provides national coverage. Most tables show provincial and territorial data, and some data for census metropolitan areas are included in most publications. In addition, some tables include comparable data from earlier censuses.

The series consists of 24 publications. Two of these publications are devoted to income characteristics. The contents of the two income publications in the Nation Series are summarized below:

#### (a) Selected Income Statistics, Catalogue No. 93-331

This publication provides selected income statistics for individuals, families and households for 1985 and 1990 in constant (1990) dollars. Included are tables presenting 1985 and 1990 total income, employment income, wages and salaries size distributions for population 15 years and over by sex, age, work activity and marital status. Census family and household income size distributions for 1985 and 1990 are provided, by family structure, combination of employment income recipients, household type and size. The publication also includes statistics on the incidence of low income among economic families, unattached individuals, and presents this data for the population in 1985 and 1990. All tables provide data for Canada, provinces, territories and census metropolitan areas.

#### (b) Employment Income by Occupation, Catalogue No. 93-332

This publication consists of one table which provides average employment income in constant (1990) dollars in 1985 and 1990 for population 15 years and over by sex, work activity and detailed occupation. The statistics are presented separately for all persons with employment income and for those who worked full year, full time.

### 2. Profile Series

The Profile Series presents data on a wide range of census variables for a variety of subprovincial areas. This series is composed of two parts. Part A provides basic demographic, housing and family characteristics, while Part B presents social, cultural, labour and income data. The series contains a large number of publications, grouped by geographic areas as follows:

- (a) **Census Divisions and Subdivisions**, Catalogue Nos. 95-301 to 95-398
- (b) **Federal Electoral Districts**, Catalogue Nos. 93-335 and 93-336
- (c) **Census Metropolitan Areas and Census Agglomerations**, Catalogue Nos. 93-337 and 93-338
- (d) **Urban and Rural Areas**, Catalogue Nos. 93-339 and 93-340
- (e) **Enumeration Areas (EAs)**, Magnetic tape and CD-ROM

- (f) **Urban Forward Sortation Areas (FSAs)**, CD-ROM
- (g) **Census Tracts**, Catalogue Nos. 95-303 to 95-392

Included in Part B of each geographic group are data on the following: income size distributions of individuals, families and households; average employment income by sex of full-year, full-time and part-year/part-time workers; incidence of low income among economic families, unattached individuals and the population in private households; and the composition of income in each area. These data are also available in machine-readable form.

### 3. Focus on Canada Series

The publications in the Focus on Canada Series provide overviews of a wide variety of subjects on which the 1991 Census collected information. The studies have been written by subject-matter experts within Statistics Canada in non-technical language, and are supported by simple tables and attractive charts.

The series consists of 11 publications, of which the following two are devoted to income:

- (a) **Family Income in Canada**, Catalogue Nos. 96-318E and 96-318F

This study concentrates on an examination of changes in family incomes between 1970 and 1990 in terms of constant (1990) dollars, by selected characteristics such as family structure, work and education patterns of husbands and wives, and the number and combination of employment income recipients. Changes in the composition of family income deciles and the share of income of various deciles are analyzed, along with changes in income inequality during the period. The study highlights the relative position of various regions and changes in this position between 1970 and 1990.

- (b) **The Earnings of Canadians**, Catalogue Nos. 96-317E and 96-317F

This study highlights the major differences in the employment income of various population groups. Classified by sex, average employment income is examined in relation to age, marital status, education and major field of study, work activity and occupation. Earnings distributions are examined for Canada by age and work activity. One section explores the changes in average earnings by work activity for Canada since 1970, while another examines the changes in the distribution of earnings of men and women over this time period. Provincial differences in average earnings since 1970 are also presented briefly.

### 4. Public Use Microdata Files

Another important product from the 1991 Census consists of microdata files. As was stated in Section IV, the detailed census questionnaire (2B) was given to a 20% sample of all households. The microdata files take a subsample of 2B households and place them in the public domain. To ensure and preserve the confidentiality of the data, the level of detail on certain variables, available on the main census database, could not be placed on these files.

These files contain a wide range of data on the population of Canada, the provinces, and most metropolitan areas. These microdata files are unique among census products, since they allow the users to return to the database unit of the census, enabling them to group data to suit their own requirements. As a result, the files are a powerful analytical and research tool.

The following three microdata files from the 1991 Census are available:

- (a) **Households and Housing File**

The household microdata file does not show information on all sources of income. Instead, these sources are grouped into household employment income, government transfer payments, investment income, retirement pensions and other income. In addition, the file contains data on total household income, major source of household income, number of employment income recipients, and number

of income recipients in the household. The file also contains data on most of these variables in respect of the household maintainer and his/her spouse and economic family.

**(b) Family File**

Like the household file, the family microdata file does not show information on all sources of income. Instead, these sources are grouped, for each census family and non-family person, into employment income, government transfer payments, investment income, retirement pensions and other income. In addition, the file contains data on total income, major source of family income, number of employment income recipients, number of income recipients in the family, and family income status. The file also contains data on most of these variables in respect of husbands, wives and lone parents.

**(c) Individual File**

Except for non-farm self-employment income and farm self-employment income, which are combined into one component, information on all sources of income is available for the individual file. In addition, data on total income, major source of income, major source of income of each individual's census family, and total income size group of the individual's census family and household are present in this file.

For details on sampling, content, etc., consult the 'Documentation and User's Guide' for each file.

## 5. Basic Summary Tables

These data are produced to meet the needs of users who wish to study the characteristics of small areas. Tables provide information on a variety of census variables and are produced for six geographic levels: (i) Canada, provinces and territories; (ii) census subdivisions (municipalities) and census divisions (counties); (iii) census metropolitan areas and tracted census agglomerations; (iv) census tracts and provincial census tracts; (v) enumeration areas; (vi) federal electoral districts.

There are four income tables in this set which provide (i) the number, aggregate and average total and employment income of the population 15 years and over by sex; (ii) the total income distribution for the population 15 years and over by sex; (iii) the total family income distribution for all census families; and (iv) the total household income distribution for all private households.

Data on the basic summary tables are also available in machine-readable form to facilitate aggregation and manipulation.

## 6. Other Related Products

As was mentioned earlier, most analysis of socio-economic characteristics includes some income data. In addition, the analysts in the Labour and Household Surveys Analysis Division undertake income analyses which are published as articles in Statistics Canada's quarterly journals **Perspectives on Labour and Income** and **Social Trends**, or as individual papers in the Division's **Staff Reports** and **Analytical Reports**. User of census income data should also be aware of two other products:

**(a) Census Reference Products**

The **1991 Census Handbook**, Catalogue Nos. 92-305E and 92-305F, provides an overview by drawing together, in a compact format, all aspects of the census from historical background to development of questionnaires, processing of the data, final data, various products, etc.

The users will find the **1991 Census Dictionary**, Catalogue Nos. 92-301E and 92-301F, of assistance in understanding and interpreting the census data and geographic concepts. The **Dictionary** provides a range of definitions for all variables and terms used in 1991 Census data products.

The **1991 Census Catalogue**, Catalogue Nos. 92-302E and 92-302F, provides a complete inventory of the products and services available from the 1991 Census.



**(b) Survey of Consumer Finances**

Users of census income data may also know that information on incomes is also collected through the annual Survey of Consumer Finances. Although the Survey does not cover the population in the Yukon and the Northwest Territories and certain other small segments of the population, the Survey and the census use an identical income concept.

Users should take note of six annual income reports from the Survey: **Income Distributions by Size in Canada**, Catalogue No. 13-207, **Family Incomes, Census Families**, Catalogue No. 13-208, **Income After Tax**, Catalogue No. 13-210, **Earnings of Men and Women**, Catalogue No. 13-217, **Household Facilities by Income and Other Characteristics**, Catalogue No. 13-218, and **Characteristics of Dual-Earner Families**, Catalogue No. 13-215.

## IX. Conclusion

This document is a brief guide to users of census income data and provides a general description of the various facets of the 1991 Census, especially those related to income. The concept of income and the processing of income data collected in a survey are quite complex. For example, the automated editing and processing of income data is conducted using hundreds of decision tables embodying logical relationships, conditions and actions. At the same time, a detailed procedure is devised and maintained to audit and monitor the impact of various actions. Such details cannot be included in this report, which is intended to provide an overview only. Users are welcome to contact the following officers in the Census Income Statistics Section for further information on any aspect of income data from the census:

- Abdul Rashid (613) 951-6897
- John Gartley (613) 951-6906
- Pierre Bélanger (613) 951-0087

## Other Census Related Products

The 1991 Census product line is designed to serve the diverse needs of our users. A wide range of products and services are available from the 1991 Census of Population. They are organized into five categories:

- (1) **Reference Products** are designed to make census products and services easier to use by helping clients identify their needs and to find and interpret the data.
- (2) **Data Products** present a wide range of census data for standard geographical areas, covering social, cultural and economic characteristics of Canadians.
- (3) **Analytical Products** provide an interpretation of the 1991 Census data covering a variety of topics or themes, and present the findings in easy-to-read publications.
- (4) **Tabulation Services** provide tabulations aimed at meeting users' needs in a more detailed or specific form than is available in standard products.
- (5) **Workshops and Seminars** are offered to inform new and current data users about census data and to assist them in maximizing the value of census data to meet their needs.

To obtain more detailed information on the products and services available from the census, refer to the **1991 Census Catalogue**, Catalogue No. 92-302E.

### Income Data Publications from the 1986 Census

93-114	Total Income: Individuals
93-115	Employment Income: Individuals
93-116	Employment Income by Occupation
93-117	Family Income: Census Families
93-118	Family Income: Economic Families
93-119	Household Income: Private Households

### Reference Product – 1986 Census

Uncatalogued: User's Guide to 1986 Census Data on Income

### Analytical Products – 1986 Census

98-128	Family Income Focus on Canada
98-129	Employment Income Focus on Canada

### Other 1986 Census Products

In addition to the above publications, a wide range of income data from the 1986 Census is also available in varying detail, for different geographic areas, in other formats. Please consult **Products and Services, Catalogue 99-103E or 99-103F** for details.

### Data Products - 1991 Census

- 93-331      Selected Income Statistics  
              The Nation
- This publication includes income size distributions for individuals, census families and private households in addition to low income statistics for families and the population.
- 93-332      Employment Income by Occupation  
              The Nation
- P9101      Number, Aggregate and Average 1990 Total Income and Employment Income of Population 15  
              Years and Over by Sex  
              Basic Summary Tabulations
- P9102      Population 15 Years and Over by Sex and 1990 Income Groups  
              Basic Summary Tabulations
- P9103      Census Families in Private Households by 1990 Family Income Groups  
              Basic Summary Tabulations
- P9104      Private Households by 1990 Household Income Groups  
              Basic Summary Tabulations

### Reference Product - 1991 Census

- 92-340E    Income  
              1991 Census Technical Reports

### Analytical Products - 1991 Census

- 96-317E    Earnings of Canadians  
              Focus on Canada
- 96-318E    Family Income in Canada  
              Focus on Canada

In addition to the products noted, selected income data, including the incidence of low income, are profiled for the population, census families and private households in federal electoral districts, census metropolitan areas, census divisions and subdivisions and other standard geographic areas in the **Area Profile Series**.

## Regional Reference Centres

Statistics Canada's regional reference centres provide a full range of census products and services. Each reference centre is equipped with a library and a sales counter where users can consult or purchase publications, microcomputer diskettes, microfiche, maps and more.

The staff of the regional reference centres provides consultative and research services in addition to providing after-sales service and support, including seminars and workshops on the use of Statistics Canada information.

Each centre has facilities to retrieve information from Statistics Canada's computerized data retrieval systems CANSIM and E-STAT. A telephone inquiry service is also available with toll-free numbers for regional users outside local calling areas. Call, write, fax or visit the nearest regional reference centre for more information.

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Serving the provinces of Newfoundland and Labrador, Nova Scotia, Prince Edward Island and New Brunswick.

Advisory Services  
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Viking Building, 3rd Floor  
Crosbie Road  
St. John's, Newfoundland  
A1B 3P2

Toll-free service: 1-800-565-7192  
Fax number: (709) 772-6433

Advisory Services  
Statistics Canada  
North American Life Centre  
1770 Market Street  
Halifax, Nova Scotia  
B3J 3M3

Toll-free service: 1-800-565-7192  
Local calls: (902) 426-5331  
Fax number: (902) 426-9538

### Quebec Region

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Statistics Canada  
200 René Lévesque Blvd. W.  
Guy Favreau Complex  
Suite 412, East Tower  
Montréal, Quebec  
H2Z 1X4

Toll-free service: 1-800-361-2831  
Local calls: (514) 283-5725  
Fax number: (514) 283-9350

### National Capital Region

Statistical Reference Centre (NCR)  
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R.H. Coats Building Lobby  
Holland Avenue  
Ottawa, Ontario  
K1A 0T6

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Local calls: (613) 951-8116  
Fax number: (613) 951-0581

### Ontario Region

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Statistics Canada  
Arthur Meighen Building, 10th Floor  
25 St. Clair Avenue East  
Toronto, Ontario  
M4T 1M4

Toll-free service: 1-800-263-1136  
Local calls: (416) 973-6886  
Fax number: (416) 973-7475

### Pacific Region

Serving the province of British Columbia and the Yukon Territory.

Advisory Services  
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757 West Hastings Street  
Vancouver, British Columbia  
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Local calls: (604) 666-3691  
Fax number: (604) 666-4863

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Advisory Services  
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344 Edmonton Street  
Winnipeg, Manitoba  
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Local calls: (204) 983-4020  
Fax number: (204) 983-7543

Advisory Services  
Statistics Canada  
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2002 Victoria Avenue  
Regina, Saskatchewan  
S4P 0R7

Toll-free service: 1-800-563-7828  
Local calls: (306) 780-5405  
Fax number: (306) 780-5403

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138 - 4th Avenue South-East  
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T2G 4Z6

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Local calls: (403) 292-6717  
Fax number: (403) 292-4958

Advisory Services  
Statistics Canada  
Park Square, 8th Floor  
10001 Bellamy Hill  
Edmonton, Alberta  
T5J 3B6

Toll-free service: 1-800-563-7828  
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## Depository Libraries

The Statistics Canada Library in Ottawa maintains complete current and historical records of all Statistics Canada publications, both catalogued and non-catalogued. The library staff is available to help users find the required information.

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R.H. Coats Building, 2nd Floor  
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Ottawa, Ontario  
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Queen Elizabeth II Library  
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A1B 3Y1

#### Prince Edward Island

##### Charlottetown

Government Services Library  
Charlottetown, Prince Edward Island  
C1A 3T2

#### Nova Scotia

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Dalhousie University  
Killam Memorial Library  
Halifax, Nova Scotia  
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H3A 1Y1

Université de Montréal  
Bibliothèque des sciences humaines  
et sociales  
Montréal, Quebec  
H3C 3T2

Université du Québec à Montréal  
Bibliothèque  
Montréal, Quebec  
H2L 4S6

##### Québec

National Assembly Library  
Québec, Quebec  
G1A 1A5

##### Sherbrooke

Université de Sherbrooke  
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Sherbrooke, Quebec  
J1K 2R1

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G1K 7P4

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L8R 3K1

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L8S 4L6

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Queen's University at Kingston  
Douglas Library  
Kingston, Ontario  
K7L 3N6

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The University of Western Ontario  
D.B. Weldon Library  
London, Ontario  
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Chancellor Paterson Library  
Thunder Bay, Ontario  
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## Toronto

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# Nuts and Bolts of Census Data

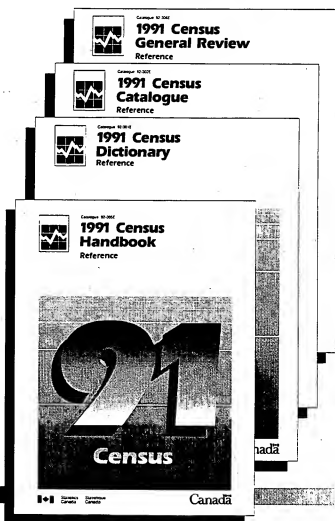
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